AMENDMENTS TO THE CLAIMS:

Please amend claims 35-39 and 45-47 as follows.

This listing of claims will replace all prior versions, and listings, of claims in the application:

1-34 (cancelled)

35. *(Currently Amended)* A method of determining ~~the~~ relative amounts of different chemical elements E_1 to E_n in ~~the~~a chemical composition of a crystalline semiconductor material, the method comprising the steps of:

diffracting a beam of radiation off said crystalline material;

measuring ~~the~~an angle of at least one diffraction peak;

integrating ~~the~~ intensity of a portion of the diffracted radiation over a portion of said at least one diffraction peak located at said diffraction angle; and

using a processor, determining the relative amounts of the elements E_1 to E_n in the chemical composition of said crystalline material by using values derived from ~~the~~a radiation scattering powers of said elements E_1 to E_n and the position and integrated intensity of said portion of said at least one diffraction peak.

36. *(currently amended)* A method according to claim 35 wherein ~~the or each or some of said diffraction peaks, or the or each or~~ at least some of said portions of said diffracted ~~energy~~radiation~~,~~ is at a quasi-forbidden angle of diffraction from said semiconductor material.

37. *(currently amended)* A method according to claim 36 wherein ~~the or each or~~ some of said quasi-forbidden diffraction is at a (002) reflection.

38. *(currently amended)* A method according to claim 36 wherein ~~the or each or~~ some of said quasi-forbidden diffraction is at a (006) reflection.

39. *(currently amended)* A method according to claim 35 wherein ~~the or each or some of said diffraction peaks or the or each or~~ at least some of said portions of said diffracted ~~energy~~radiation is resultant from a (004) reflection.

40. *(Previously Presented)* A method according to claim 35 comprising using a knowledge of the structure of said material and the possible elements present in said material to determine the chemical composition of said material.

41. *(Previously Presented)* A method according to claim 35 wherein said crystalline semiconductor material is assumed to be comprised of only a finite number of known predetermined chemical elements and said processor has operational in its processing of the measured input data and stored element scattering power values only the scattering powers for the known predetermined assumed finite number of elements that are assumed to be present.

42. *(Previously Presented)* A method according to claim 41 wherein said material is assumed to be comprised of four or less chemical elements.

43. *(Previously Presented)* A method according to claim 35 comprising determining the composition of a layer of a material and making use either of (i) a knowledge of the thickness of said layer, or (ii) an assumption of the thickness of said layer being analyzed.

44. *(Previously Presented)* A method according to claim 35 comprising determining the composition of a single layer of a material on a substrate of said material.

45. *(currently amended)* A method according to claim 35 comprising either of (i) measuring the position of at least two diffraction peaks; (ii) measuring the position of at least two portions of the diffracted ~~energy~~radiation; and using a knowledge of their position to determine the relative amount of chemical elements in the chemical composition of said semiconductor material.

46. *(currently amended)* A method according to claim 35 comprising either of (i) measuring the intensity of diffracted beams at at least two positions; (ii) or measuring the intensity of at least two portions of the diffracted ~~energy~~radiation; and using this knowledge to determine the chemical composition of said semiconductor material.

47. *(currently amended)* A method according to claim 35 comprising measuring the intensity of either of (i) two diffraction peaks; (ii) two portions of the diffracted ~~energy~~radiation.

48. *(Previously Presented)* A method according to claim 35 wherein said semiconductor material is a quaternary semiconductor material.

49. *(Previously Presented)* A method according to claim 35 wherein said semiconductor material is a ternary semiconductor material.

50. *(Previously Presented)* A method according to claim 48 further comprising either (i) measuring a parameter indicative of the lattice parameter of said quaternary semiconductor material; (ii) assuming a parameter indicative of the lattice parameter of said quaternary semiconductor material; and using this parameter and the intensity of either of (a) a diffraction peak, (b) the parameter indicative of the intensity; to provide, in a single diffraction measurement, an estimate of the composition of said material.

51. *(Previously Presented)* A method according to claim 35 wherein said semiconductor material is a III-V semiconductor material.

52. *(Previously Presented)* A method according to claim 35 wherein said composition of an at least partially strained semiconductor material is analyzed.

53. *(Previously Presented)* A method according to claim 35 wherein said semiconductor material is a single crystal material.

54. *(Previously Presented)* A method according to claim 35 wherein the percent of each chemical element of the chemical composition of said semiconductor material is analyzed with an error of 0.1% or below.

55. *(Previously Presented)* A method according to claim 35 which comprising measuring a parameter indicative of the lattice parameter of said semiconductor material.

56. *(Previously Presented)* A method according to claim 55 which is used to analyze the composition of a buried, non-surface, layer in the semiconductor material.

57. *(Previously Presented)* A method according to claim 35 comprising comparing the detected composition of said semiconductor material to a reference composition to determine if the detected composition is either (i) equal to that composition; (ii) falls within a predetermined range around the reference composition; and producing a first output if said measured composition falls within said range and a second output if said measured composition falls outside said range.

58. *(Previously Presented)* A method according to claim 35 including integrating said portion of the diffracted radiation over a region of said diffraction peak centered upon a point of maximum intensity of said diffraction peak.

59. *(Cancelled))*

60. *(previously presented)* Chemical composition analysis apparatus comprising:

a sample holder,

a beam source,

at least one detector,

a controller, and

a processor, said controller being adapted to control said beam source and detector to direct a beam of energy onto a sample held in said sample holder and said at least one detector detects diffracted energy at diffraction angles, said at least one detector being coupled to said processor to provide said processor use with signals representative of the position of a diffraction peak and the intensity of said diffraction peak, and said processor being arranged to use said signal representative of the position of said diffraction peak and an integrated signal representative of the intensity of the diffraction peak over at least a portion thereof to evaluate the relative amounts of the predetermined chemical elements in the chemical composition of said sample.

61. *(Previously Presented)* Apparatus according to claim 60 having an element selection inputter adapted to enable a user to identify to said processor which chemical elements are to be assumed to be present in said sample to be analyzed, and therefore which chemical element scattering powers, or factor dependent upon the scattering powers, are to be used by said processor in determining the relative amounts of the chemical elements in the sample, said processor being adapted in use to operate with its processor on the measured input variables from said detector(s) and a subset of element scattering powers, or derived values, selected from a larger set of stored element scattering powers, or derived values, said subset being selectable by the operation of the element selection inputter.

62. *(Previously Presented)* Apparatus according to claim 60 wherein said sample holder, beam source and detector(s) are pre-set at predetermined positions relative to each other at a relationship where for a sample of a known kind said or at least one detector is disposed so as to detect at a quasi-forbidden diffraction angle.

63. *(Previously Presented)* Semiconductor wafer checking apparatus comprising apparatus according to claim 60.

64. *(Previously Presented)* A data carrier carrying a program which when running on detection apparatus is adapted to enable said apparatus to perform a method of claim 35.

65. *(Previously Presented)* Apparatus for the analysis of the composition of a semiconductor material being arranged to operate in use in accordance with the method of claim 35.

66. *(Previously Presented)* A composition measurement system arranged to analyze the composition of a semiconductor material according Claim 35 and to compare this to a reference or output the results of the analysis.

67. *(Previously Presented)* A method of manufacturing a semiconductor chip comprising manufacturing a semiconductor wafer, analyzing the composition of said wafer according to claim 35 to test if it passes or fails a composition analysis test, and performing fabrication operations on said wafer to produce the chip if the wafer has a composition within predetermined

parameters, and rejecting the wafer for further processing or fabrication operations if it has a composition outside of said predetermined parameters, rejected wafers not being subject to at least one processing step that they would have received had they passed.

68. *(Previously Presented)* A method according to claim 67 wherein wafers that pass said compositional analysis test and/or chips produced from such wafers are accompanied by data either confirming that they passed, or data giving details of their compositional analysis.

69. *(Cancelled)*

70. *(Previously Presented)* A method of determining the relative amounts of different chemical elements E_l to E_n in the chemical composition of a crystalline semiconductor material, the method comprising diffracting a beam of radiation off the crystalline material and measuring the angle of at least one diffraction peak and the intensity of a portion of the diffracted radiation integrated over a window centered on the maximum peak intensity of said at least one diffraction peak located at said diffraction angle, and using a processor to determine the relative amounts of the elements E_l to E_n in the chemical composition of said crystalline material by using values derived from the radiation scattering powers of said elements E1 to En and the position and integrated intensity of said window of said at least one diffraction peak.